PATENT SPECIFICATION

Application Date: Aug. 6, 1937. No. 21677/37.

497,051

Complete Specification Left: Jan. 31, 1938.

Complete Specification Accepted: Dec. 12, 1938.

PROVISIONAL SPECIFICATION

A Resilient Device, for Use in a Vehicle Suspension System or elsewhere

I, EDWARD TURNER, a British Subject, of the Triumph Engineering Company Limited, Dale Street, Coventry, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to resilient devices, particularly for use in the suspension systems of motor-vehicles, although the invention is not limited in this respect. In the specification of my prior Application No. 15618/37 (Serial No. 497,008) I have described a resilient device which forms a satisfactory substitute for the ordinary helical spring, and it is my main object to improve such a device and to extend the use of the device.

Broadly, a resilient device, according to the invention, comprises a helical spring having adjacent surfaces of some at least of the convolutions connected together through rubber or like deformable material vulcanized or otherwise fixedly secured to said surfaces.

Preferably the spring is stressed from its normal state whilst the deformable material is being applied.

The convolutions may be wholly embedded and adherent to the deformable material or the extent to which the convolutions may be engaged with the deformable material may vary along the length of the spring.

In one method of carrying out the invention, a coil-compression spring having convolutions of substantially rectangular cross-section is extended beyond its normal state and then has applied to it between adjacent convolutions rubber which is caused firmly to adhere thereto as by vulcanizing or by other methods. The rubber in effect forms a helical deformable strip filling in the space between the convolutions. When the spring is unstressed the rubber will be deformed laterally and will bulge beyond the inner and outer diameters of the convolutions. When the spring is extended beyond that point to which it was extended when the rubber was applied, the latter can stretch between the convolutions owing to the adherent fixing. In this way the device is well able to operate in tension and compression.

The spring may alternatively be compressed from its normal state during the application of the rubber to its convolutions.

In another embodiment, where the resilient device is to be used as a substitute for a spring with a predetermined load-deflection curve, only some of the convolutions of the spring may have the deformable material applied to them, and the amount of rubber between the convolutions may vary along the length of the spring. Thus, the two adjacent end convolutions may be wholly embedded while subsequent convolutions may only have the rubber applied between diminishing portions of the adjacent surfaces.

By the invention therefore a resilient device is provided which is particularly durable and suitable for many purposes where resilience combined with damping is required.

Dated this 5th day of August, 1937.
WALFORD & HARDMAN BROWN,
Chartered Patent Agents,
Roslyn Chambers, Warwick Road,
Coventry, Warwickshire.

COMPLETE SPECIFICATION

A Resilient Device, for Use in a Vehicle Suspension System or elsewhere

I, EDWARD TURNER, a British Subject, of the Triumph Engineering Company Limited, Dale Street, Coventry, Warwickshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The ordinary helical coil spring is particularly effective in compression and caters for large deflections, but when of constant or substantially constant diameter throughout its length it has a rectilinear deflection graph. In con-

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objective, when used, for example, in a suspension system of a vehicle, it is necessary, for its action to be supplemented by a shock-absorber and or a rebound damper.

It is one of my objects to provide a resilient device having a curved deflection graph both in compression and tension, whereby it may be used, if desired, in a vehicle suspension system without requiring the assistance of a shock-absorber and or rebound damper.

The resilient device of the invention broadly consists in a helical coil spring having adjacent surfaces of some or all of the coils connected together through a rubber helix which is vulcanized or otherwise fixedly secured to said surfaces without the internal or external peripheries of the coils thus secured being embedded in the rubber. The spring may be stressed from its normal state whilst the rubber is being applied. The extent to which the coils are engaged with the rubber may vary along the length of the spring.

The term rubber is used herein to include artificial as well as natural rubber or rubber compounds.

In the accompanying drawings:—

Figures 1 to 3 show one form the resilient device may take; and

Figure 4 shows another form.

In the construction of Figures 1, 2 and 3, a helical coil spring 11 having coils of substantially rectangular cross-section is extended beyond its normal state, to the position shown in Figure 1, and then has applied to it, between adjacent coils, rubber 12, which is caused firmly to adhere thereto by vulcanizing or other methods. The rubber in this case forms a helical deformable strip filling in the space between the coils. When the spring is unstressed (Figure 2) the rubber will be deformed laterally and will bulge beyond the inner and outer diameters of the coils. When the spring is extended, as shown by Figure 3, beyond that point to which it was extended when the rubber was applied, the latter can stretch between the coils owing to the adherent fixing. In this way the device is well able to operate in tension and compression.

The ability of the rubber to resist the applied stress increases materially as the stressing of the device increases.

The spring may alternatively be compressed from its normal state during the application of the rubber to its coils.

In the embodiment of Figure 4, where the device is to be used as a substitute for a spring with a predetermined load-deflection curve, only some of the coils of the spring 11 have the rubber 12 applied to them, and the amount of rubber between the coils varies along the length of the spring. Thus, the two adjacent end coils 17 may be wholly embedded while subsequent coils may have the rubber applied only between diminishing portions of the adjacent surfaces.

By the invention, therefore, a resilient device is provided which is particularly durable and suitable for many purposes where resilience combined with damping is required.

The specification accompanying my co-pending prior Application No. 15618/37 (Serial No. 497,008) claims a motor-cycle wheel suspension including a resilient device in the form of a helical coil spring having adjacent surfaces of some or all of the coils connected together through rubber or like deformable material, one end of the device being attached to a part movable with the wheel and the other to the frame. The drawings thereof show a helical coil spring wholly embedded in rubber. Here I make no claim to any such motor-cycle suspension.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A resilient device, for use in a motor-vehicle suspension system or elsewhere, consisting of a helical coil spring having adjacent surfaces of some or all of the coils connected together through a rubber helix which is secured to said surfaces, as by vulcanization without the internal or external peripheries of the coils thus secured being embedded in the rubber; subject to the disclaimer aforesaid.

2. A resilient device, according to Claim 1, characterized in that there is a greater quantity of rubber between one pair of adjacent coils than between another.

3. A resilient device, according to Claim 2, characterized in that the greatest amount of rubber is at one end of the spring and the least (or none) is at the other, the quantity of rubber between adjacent coils varying substantially uniformly along the length of the spring.

4. A resilient device, according to any preceding claim, of which the spring is stressed, either by being compressed or by being extended, while the rubber is being applied to it.

5. A resilient device arranged substantially as hereinbefore described with reference to Figures 1 to 3 to Figure 4 of the accompanying drawings; subject to the disclaimer aforesaid.

33

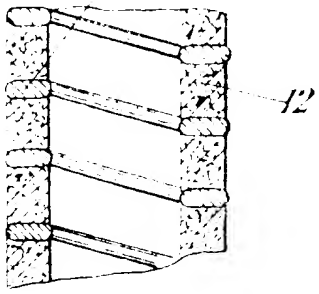

Fig. 1.

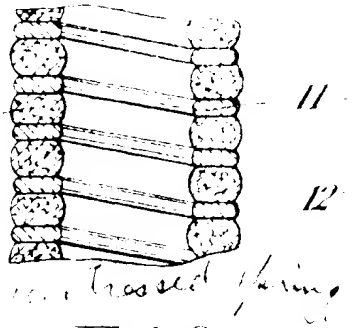

Fig. 2.

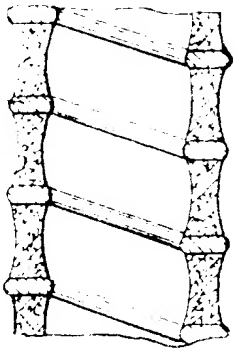

Fig. 3

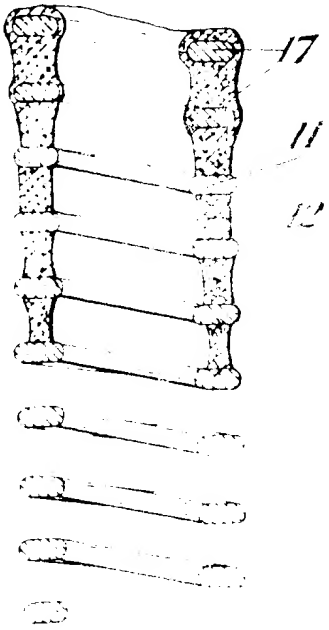

Fig. 4.

Dated this 19th day of July, 1938.

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